1. SCOPE

2. CONNECTIONS

2.1 Input connector

2.2 Output connector

3. ELECTRICAL REQUIREMENTS

3.1 Input

3.1.1 Input voltage

3.1.2 Input current

3.1.3 Input frequency

3.1.4 Inrush current

3.1.5 Efficiency

3.2 Output

3.2.1 Output power

3.2.2 Output voltage

3.2.3 Output current

3.2.4 Output regulation

3.2.5 Output ripple and noise voltage

3.2.6 Output transient response

3.2.7 Output voltage drift

3.2.8 Output overshoot

3.2.9 Output protection

3.2.10 Rise time

3.2.11 Turn-on delay

3.2.12 Output hold-up time

3.2.13 Power fail (Optional)

3.2.14 Temperature coefficient

4. ENVIRONMENTAL REQUIREMENTS

4.1 Temperature

4.2 Altitude

4.3 Humidity

4.4 Shock and Vibration

4.5 EMC, Input transient susceptibility

5. SAFETY REQUIREMENTS

5.1 Dielectric withstand voltage

5.2 Insulation resistance

5.3 Leakage current

5.4 Safety spacing

5.5 Safety standards

5.6 Reliability

5.6.1 MTBF

6. EMI REQUIREMENTS

7. APPLICABLE TEST DOCUMENTS

8. MECHANICAL

8.1 Weight

8.1.1 Complete Unit

8.2 Dimensions

8.2.1 Outline dimension

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Process Capability, CP
Process Capability Index, C_{Pk}

1. SCOPE

The purpose of this power supply document is to specify the functional requirements of a convection cooled 80 watt continuous output with 90-264 VAC input range. The power supply contains a single DC output in an open frame, PCB mount design.

Models covered : VLT80-1000, VLT80-1001, VLT80-1002, VLT80-1003, VLT80-1004

2. CONNECTIONS

The following specifies the input and output connections provided by the power supplies:

2.1 INPUT CONNECTOR
3 position, 2 pin, 0.156 center header, Molex P/N 26-60-4030 or equivalent.
J1-1 (N), J1-2 (L)

2.2 OUTPUT CONNECTORS
12 position, 12 pin, 0.156 center header, Molex P/N 26-60-4120 or equivalent.

VDC	Pins 1-4
COM	Pins 5-8

Optional: 2 position, 0.100 center header, Molex P/N 22-23-2021 or equivalent.
J3-1 (Output Common), J3-2 (Power Fail)

3. ELECTRICAL REQUIREMENTS

(Unless noted otherwise, all specifications are at nominal input voltage, full load, 25°C, with power supply in a warmed up condition.)

3.1	INPUT The operating conditions for the AC input are described in this section.
3.1.1	INPUT VOLTAGE The operating range is 90 – 264 VAC, single phase. Nominal input voltage is 100VAC and 240VAC.
3.1.2	INPUT CURRENT With an input voltage of 90VAC, at 80W output, the RMS input current is less than 2.0A.
3.1.3	INPUT FREQUENCY Input frequency range 47 – 63 Hz.
3.1.4	INRUSH CURRENT Maximum inrush is 75A at 240VAC and cold start.
3.1.5	EFFICIENCY The efficiency of the power supply is 80%-90% typical, depending on the model. Measured at 240VAC input voltage and full load. Voltages measured at the PCB connector pads, 25°C ambient air, and after a 5 minute warm up cycle.
3.2	OUTPUT The operating conditions for the DC output are described in this section.
3.2.1	OUTPUT POWER The power supply will provide a single regulated DC output. The maximum total continuous output power with free air convection is 80 watts for VLT80-1001, -1002, -1003, -1004 and 60 watts for VLT80-1000.
3.2.2	OUTPUT VOLTAGE Initial setting tolerance is measured with 50% of load range on the output, line voltage set

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Process Capability Index, C_{Pk}

at nominal. The voltage and initial setting tolerance of the output is as follows:

Model	NOMINAL VOLTAGE	SET TOL.
VLT80-1000	+5.1	± 3 %
VLT80-1001	+12V	± 3 %
VLT80-1002	+15V	± 3 %
VLT80-1003	+24V	± 3 %
VLT80-1004	+48V	± 3 %

3.2.3 OUTPUT CURRENT

3.2.3.1 RATED OUTPUT CURRENT
The maximum continuous current for each model is listed in the following table.

Model		
	Min. I	Max. I
VLT80-1000	1.0A	12.0A
VLT80-1001	0.4A	6.5A
VLT80-1002	0.4A	5.5A
VLT80-1003	0.2A	3.5A
VLT80-1004	0.2A	1.7A

3.2.4 OUTPUT REGULATION

3.2.4.1 LINE REGULATION
Measured by varying the line voltage from 90 - 264VAC at full load.

TOLERANCE
0.3%

3.2.4.2 LOAD REGULATION
Measured by varying the load current from minimum to maximum load at nominal AC input voltage. Measured at the output connector after 500 ms settling time, and expressed as a percentage of the set point voltage. The maximum value is shown below.

Model	
VLT80-1000	± 1 %
VLT80-1001	± 1 %
VLT80-1002	± 1 %
VLT80-1003	± 1 %
VLT80-1004	± 1 %

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Process Capability Index, C_{Pk}

						3.2.5	OUTPUT RIPPLE AND NOISE VOLTAGE (PARD) The maximum allowable pk-pk PARD ripple and noise, measured at 100% load on the output, is shown in the following table. It is measured after a 5 minute warm up with 0.1uF C-Cap and 10uF E-Cap/Tant Cap connected at the measurement point. Oscilloscope measurement with 1:1 probe, 20 MHz bandwidth.

Model	
VLT80-1000	50 mV
VLT80-1001	120 mV
VLT80-1002	150 mV
VLT80-1003	240 mV
VLT80-1004	480 mV

						3.2.6	OUTPUT TRANSIENT RESPONSE The load current of the measured output is changed from 50% of load range to 100%, at 0.1A/uSec slew rate, 50% duty cycle, 50/60Hz. The recovery time and maximum excursion is measured from where the output voltage is at the edge of the load regulation band of section 3.2.4.2. It is measured after a 5 minute warm up with 0.1uF C-Cap and 47uf E-Cap connected at the measurement point to reflect an actual load setup. All other outputs are kept at 50% load.

RECOVERY TIME	MAXIMUM EXCURSION
≤1 ms	<10%

						3.2.7	OUTPUT VOLTAGE DRIFT Long-term output voltage drift of V1 over 1000 hours operation is less than 0.5%.
						3.2.8	OUTPUT OVERSHOOT The overshoot voltage is measured as a percentage of the nominal output voltage when the power supply is turned on. Measured with the output at 50% load.

OVERSHOOT
<10%

						3.2.9	OUTPUT PROTECTION The power supply protects itself from any fault condition described below and will self-recover with a maximum restart time of 5 seconds after the fault is removed.	
						3.2.9.1	OVERVOLTAGE N/A	
						3.2.9.2	OVERLOAD PROTECTION Typically occurs between 110-150% of maximum power. The output shuts down and hiccups. The output will recover when the overload condition is removed.	
						3.2.9.3	OUTPUT SHORT CIRCUIT The power supply is protected against output short circuit. Average current is less than 0.5A under all conditions. Output voltage of less than 0.5V constitutes a short.	

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						3.2.10	RISE TIME The output rise time measured from 10% to 90% is :

RISE TIME
<40 ms

						3.2.11	TURN-ON DELAY The turn-on delay time of the output after AC power is applied from a cold condition is 5.0 seconds maximum at 115 VAC.
						3.2.12	OUTPUT HOLD-UP TIME The power supply maintains the output within its voltage/current specifications for a minimum of 10 milliseconds after loss of input power. Input voltage is 115VAC. Measured at the regulation band crossing.
						3.2.13	POWER FAIL (OPTIONAL) The power fail signal is active low and capable of sourcing 2.0mA and sinking 4.0mA. Power fail gives 2ms min. warning before output drops out of regulation band of 3.2.4.2 at any line voltage of 3.1.1.
						3.2.14	TEMPERATURE COEFFICIENT Temperature coefficient over entire operating temperature range of 0ºC to 50ºC after one-hour warm-up is:

COEFFICIENT
≤2.4mV/°C

4. ENVIRONMENTAL REQUIREMENTS

						4.1	TEMPERATURE Operating temperature range: 0ºC to 50ºC at the full rated output power. From 50º-70ºC the power supply can be operated by derating the total output power by 2.5%/ºC. Non-operating temperature range: -40ºC to +70ºC.
						4.2	ALTITUDE Maximum operating altitude: 10,000 feet. Maximum non-operating altitude: 40,000 feet.
						4.3	HUMIDITY Non-condensing relative humidity range: 5% to 95%.
						4.4	SHOCK AND VIBRATION Operating Shock: Three shocks, 15G peak, 11mS sinusoidal, ±1 mS. Both directions of perpendicular axis. Non-Operating Shock: Three shocks, 50G peak, 11mS sinusoidal, ±1 mS. Both directions of perpendicular axis. Operating and Non-Operating Vibration: 5-9Hz, 0.5" double amplitude, 2G PK, 0.5 oct./min, 2 cycles; 9-500Hz, 4G pk-pk, 0.5 oct./min, 2 cycles.
						4.5	EMC, INPUT TRANSIENT SUSCEPTIBILITY The unit complies with the requirements of IEC 1000-4-2, IEC1000-4-4 and IEC 1000-4-5.
						4.6	N/A

5. SAFETY REQUIREMENTS

						5.1	DIELECTRIC WITHSTAND VOLTAGE Minimum dielectric withstand voltage between input and chassis ground: 2121VDC for 1 minute.
						5.2	INSULATION RESISTANCE Minimum insulation resistance between input and output: 7 Mohm.
						5.3	LEAKAGE CURRENT Leakage current from line to ground: 500µA maximum.

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Process Capability Index, C_{Pk}

						5.4	SAFETY SPACINGS The power supplies comply with the working voltage creepage and clearance requirements of 5.5.	
						5.5	SAFETY STANDARDS The power supply meets Class 1, SELV of the following safety agency requirements: IEC950, EN60950 with the following deviations: VDE UL 1950 (Recognized Component) C-UL (Canadian Approval by UL)	
						5.6	RELIABILITY	
							5.6.1	MTBF (Mean time between failure): MTBF @ 25ºC is more than 200,000 hours. Calculated as per Mil handbook 217F.

6. EMI REQUIREMENTS

The power supply complies with the limits CISPR 55022 and CISPR 55014, Class B (at 230 VAC and 115 VAC). FCC 47 CFR Part 15, Class B (115 VAC)

7. APPLICABLE TEST DOCUMENTS

Audit Test Program
Production 1 Test Program
Production 2 Test Program
QC Test Program

8. MECHANICAL

8.1 WEIGHT

8.1.1 Complete PSU : Total weight = 9 oz.

8.2 DIMENSIONS

8.2.1 Outline Dimension: External dimensions of the power supply including the heatsink is shown below.

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Process Capability, CP
Process Capability Index, C_{Pk}